UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,248	05/26/2006	Jun Gao	284530US0PCT	3427

22850 7590 04/01/2009

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
SALVITTI, MICHAEL A	
ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
04/01/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/566,248	GAO ET AL.	
	Examiner	Art Unit	
	MICHAEL A. SALVITTI	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12, 13 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 12: The term "moderate to low solubility" in claim 12 is a relative term which renders the claim indefinite. The term "moderate to low solubility " is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purposes of further examination, moderate to low solubility will be assumed to be the monomers listed in page 3, lines 8-25 of the instant specification.

Regarding claim 13: The term "high solubility" in claim 12 is a relative term which renders the claim indefinite. The term "high solubility" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purposes of further examination, high solubility will be assumed to be the monomers listed in page 3, lines 27-39 of the instant specification.

Claim 19 recites the limitation "water-soluble initiator" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim. Claim 1 discloses at least one “water-soluble free radical initiator”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, and 6-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Costanza et al.* (hereinafter referred to as '871).

Regarding claim 1: '871 teaches a process for the preparation of an aqueous polymer dispersion (see abstract) by free radical aqueous emulsion polymerization (column 1, line 60). This process entails the polymerization of at least one ethylenically unsaturated monomer (styrene/butadiene; column 2, line 2). At least one dispersant may be utilized (surfactants are disclosed; columns 3-4).

As to process step (a), '871 teaches a reaction vessel at a temperature equal or less than the starting temperature (column 3, lines 46-50). To this vessel, water and initiators are added (analogous to $a_{1\text{-}2 \text{ and } }c_5$, column 2, lines 24-32). Next, the pre-emulsion is loaded. The pre-emulsion comprises water, and a dispersant (step a_3; column 2, lines 5-23) and is metered into the reaction medium (step d; column 2, lines 24-38). The reaction mixture is heated to 50°C (T_E), and monomers (pre-emulsion

mixture) are added (metered) into the reactor. The solids content of the final dispersion is listed as 50-75% (column 6, lines 28-38).

The oil and water-soluble initiators in '871 are listed in the instant specification (page 7, line 25 through page 8, line 35) where they are stated to be suitable initiators. Therefore these initiators are assumed to have the recited properties of solubility and half-life.

Processes a_{4-5}, b, c_{1-4} recited by instant claim 1 are stated to be optional steps, and were given little patentable weight.

Despite teaching the process as set forth above, '871 is silent regarding whether the water is demineralized. The use of demineralized water is common knowledge in the art of aqueous emulsion polymerizations, as hard water tends to aggregate anionic surfactants. See MPEP § 2144.03. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to use demineralized water for the emulsion polymerization, with the motivation of preventing aggregation of the polymer particulates.

Further, '871 describes a different order of mixing than the method set forth by the instant claim. '871 suggests mixing the water-soluble initiator with the oil-soluble intiator in a single step. The order of addition does not appear to matter since all components are in the reaction solution before the reaction begins. A change in the sequence of mixing ingredients is *prima facie* obvious in the absence of new or unexpected results. See *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) and *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930). MPEP § 2144.04.

Regarding claim 4: While '871 teaches the process of claim 1 as discussed above, the patent is silent regarding whether the ending temperature is at least 10°C higher than the starting temperature. However, the preferred ranges of temperatures are disclosed from ambient temperature (20°C) to 80°C or higher (column 7, lines 3-8). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to elevate the temperature to a temperature wherein T_E is greater than or equal to T_s + 10°C, with the motivation of reaching substantial reaction completion as suggested in '871 (column 7, lines 6-8).

Regarding claim 6: '871 teaches the water-soluble initiator from 0.01-0.2% by weight, and the oil-soluble initiator from 0.1-2.0% by weight (column 1, lines 62-68) based on the total monomer content.

Regarding claim 7: '871 teaches polymerizing below the boiling point of the lowest boiling monomer or under superatmospheric conditions (column 7, lines 14-18) Thus, '871 implicitly teaches the reaction mixture not boiling at any temperature.

Regarding claim 8: The water-soluble free radical initiator of '871 is potassium persulfate (column 8, lines 35-36). This is a mono-alkali metal salt of peroxodisulfuric acid.

Regarding claim 9: While '871 teaches the process of claim 1 as discussed above, the patent is silent regarding the use of the t-butyl initiators in the preferred embodiments. However, tert-butyl peroxybenzoate (akin to Trigonox C), listed in the instant claim is disclosed (column 5, line 68). '871 discloses a finite list of oil-soluble initiators. At the time of the invention, it would have been obvious to a person having ordinary skill in the

art to try one of the initiators from the list to initiate the polymerization with a reasonable expectation of success.

Regarding claim 10: Example 3 of '871 shows the reaction temperature held at 50°C for eight hours following the monomer metering (column 8, lines 34-44).

Regarding claim 11: Example 3 of '871 is worked up in the same manner as Example 1 of '871 (column 8, lines 15-27). This process involves stream stripping (column 8, line 24).

Regarding claims 12 and 13: Styrene and butadiene are the monomers used in '871 (column 8, line 15) and constitute 100% monomer parts by weight. These monomers are disclosed in the instant specification as possessing low water solubility (page 3, lines 8-25). High water solubility monomers (several, such as acrylic acid are listed in column 5, lines 3-39) are less than 10 wt. %.

Regarding claims 14 and 15: Sodium lauryl sulfate is an emulsifier, and is used 5 parts by weight monomer to be subjected to the free radical polymerization (column 8, line 17).

Regarding claim 16: Example 3 of '871 shows 50% water in the starting reaction mixture (column 8, lines 33-44) based on the total amount of water.

Regarding claim 17: Example 3 of '871 teaches all of the dispersant added during the metering of the pre-emulsified monomers (column 8, lines 33-44), suggesting that the amount in the a_3 is zero percent in the reaction vessel prior to monomer metering.

Regarding claim 18: The Example 3 experiment of '871 shows addition of a pre-emulsified mixture into a reactor (column 8, lines 33-44). This suggests that the amount of monomer present in a_4 (in the reactor) is zero percent.

Regarding claim 19: '871 teaches addition of the water-soluble initiator incrementally following the initiation of polymerization in Example 3; water-soluble initiator is not present in the reaction medium at the beginning of the reaction. However, a small amount from 10-30% by weight is stated to be preferred in the initial charge to ensure substantially complete polymerization (column 6, lines 57-64). At the time of the invention, it would have been obvious to a person having ordinary skill in the art to add a small amount of water-soluble initiator if a more complete polymerization is desired.

Regarding claim 20: '871 suggests that the oil soluble free-radical initiators can be added to the reaction at variable times or initially (column 6, lines 44-64). Example 3 (column 8, lines 33-44) shows exactly 50% of the benzoyl peroxide (oil soluble inititator) added each to the reactor.

Regarding claim 21: '871 teaches the addition of monomer over a period of 2 to 8 hours (column 7, lines 30-32).

Regarding claim 22: The water soluble free radical initiators of '871 (Example 3) are pre-emulsified before addition into the reactor, allowing for all of the water-soluble free-radical initiator to be added during monomer metering.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,003,871 to *Costanza et al.* as applied to claim 1 above, in view of U.S. Patent No. 5,908,872 to *Glück et al*. (hereinafter referred to as '872).

Regarding claim 5: While '871 teaches the process of claim 1 as discussed above, the patent is silent regarding reaction temperatures exceeding 80°C.

Patent '872 teaches a polymerization occurring with the starting temperature at 90°C and ending temperature at 130°C (column 2, line 65 through column 3, line 9). These references are analogous art, in that they contain the same technical features. Both are aqueous polymerizations with dual initiators, used for the purpose of producing polymers from vinylically unsaturated monomers. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to use the temperature profile of '872 with the reaction of '871, with the motivation of increasing the conversion of monomers ('872; column 1, lines 23-40).

Response to Arguments

1.) The Applicants have amended the title and corrected the specification without the addition of new matter in the new submission dated December 16, 2008. Furthermore, clarification regarding the conversion percentage has been provided. The objections to the title and specification have been withdrawn.

2.) Claim 9 has been amended to remove trademarks. The 112 rejection has been withdrawn.

3.) Applicant's arguments, with respect to the rejection(s) of claim(s) 1-11 under 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, new ground(s) of rejection is made in view of U.S. Patent No. 4,003,871 to *Costanza et al*. and U.S. Patent No. 5,908,872 to *Glück et al*.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL A. SALVITTI whose telephone number is (571)270-7341. The examiner can normally be reached on Monday-Thursday 8AM-7PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Eashoo can be reached at (571) 272-1197. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James J. Seidleck/
Supervisory Patent Examiner, Art Unit 1796

/M. A. S./
Examiner, Art Unit 1796